Ye Liu

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EDUCATION

The Ohio State University (OSU) **Columbus, OH**

Bachelor of Science in Computer Science and Engineering **Aug. 2021 – May 2025**

- GPA: 3.72/4.0
- Honor: Honors Research Distinction; Dean's List (Mar. 2022, Apr. 2023, Feb. 2024)

PUBLICATION

Jihyung Kil, Zheda Mai, Justin Lee, Zihe Wang, Kerrie Cheng, Lemeng Wang, **Ye Liu**, Arpita Chowdhury, Wei-Lun Chao. "CompBench: A Comparative Reasoning Benchmark for Multimodal LLMs". In: NeurIPS 2024. arXiv:2407.16837

RESEARCH

Honor Research Program: Accurate Animal Behavior Recognition Based on Traceable Video Segmentation Technique (SAM2) **Columbus, OH**

Researcher, Guided by Professor Wei-Lun Chao **Oct. 2024 – Present**

- Process video data captured by the drone, using SAM2 to conduct accurate and detailed segmentation of the body parts (head, neck, body, limbs, etc.) for each animal and track the animals in the video
- Organize the segmented animal masks and original video frames to generate a new dataset
- Use ResNet to train and fine-tune the model to consolidate its ability to recognize animal behaviors, and the CARe model was fused to increase the model's ability to predict behaviors in the occluded sections

Paper: Accurate Animal Behavior Recognition Based on Traceable Video Segmentation Technique (SAM2)

The Gut-joint Axis Project Studies Mechanisms Underlying the Gut Microbiota's Influence on Arthritis **Columbus, OH**

Research Assistant of Professor Hsin-Jung Joyce Wu, 12hrs/wk **Feb. 2024 – Present**

- Adopt specialized software tools such as R to process, analyze, and interpret transcriptome and ATAC seq data
- Apply independently designed algorithms to analyze PBMC and SFMC data provided by the Karolinska Institutet with single cell analysis tools like Seurat and extract CD4+ Tfh cell population for analysis
- Analyze OSU patient sample data independently with Seurat and other single cell analysis tools and create intuitive data visualization tools (e.g. volcano plot and heat map)
- Utilize pipeline tools, such as MIXCR, to analyze the high-frequency mutation information of BCR somatic cells extracted from mice, including mutation frequency, SHM tree, mutation distribution map, etc.

Genotype to Phenotype - DNA Trait Analysis **Columbus, OH**

Research Assistant of Professor Weilun Chao, 15hrs/wk **May 2024 – Present**

Initiated by the Imageomics Institute (OSU), an institute funded by the US National Science Foundation's Harnessing the Data Revolution (HDR) program (https://github.com/Imageomics/dna-trait-analysis)

- Design captum-based explainable methods to analyze genomic data of single species to understand how the genotype influences the specific color of phenotypes on butterfly wings through images
- Analyze existing machine learning model codes and optimize them according to the actual needs
- Design algorithms for PyTorch model training, DNA analysis, DNA image generation, etc.

Machine Learning-based Analysis and Prediction of Somatic Hypermutation in B-cell Receptor **Columbus, OH**

Independent Researcher, 5hrs/wk **Dec. 2023 – Present**

https://github.com/liu9756/BCR_SHM_ANALYSIS

- Use the Bio package in Python to design the data reading and the SHM calculation of each sequence and utilize Pandas to unify the file format
- Conduct comparison and mutation identification of immunoglobulin heavy chain variable regions (IGHV) by referring to the data related to mm39 mice in the IMGT information system

Paper: Reinforcement Learning-based Model for Predicting Somatic Hyper Mutations in Body Cells

VLM - Understanding Large Vision Language Models on Their Vision Capabilities **Columbus, OH**

Research Assistant of Professor Weilun Chao, 12hrs/wk **Apr. 2024 – Jun. 2024**

https://github.com/RaptorMai/CompBench

- Collected, tagged, and screened images that can accurately represent the visual attribute, presence, status, emotion, time, space, quantity, and quality dimensions to create a data set for AI to observe and learn from
- Completed the annotation and inspection of images efficiently with designed algorithms
- Designed algorithms with Python to read image source files and produce JSON files to store images with relevant corresponding attributes; designed random algorithms to filter and store comparable images with similar properties in pairs

SKILL

Computer:

- Programming: Java (Advanced), C++ (Advanced), Python (Advanced), C (Intermediate), MATLAB (Intermediate), R (Advanced), Ruby (Intermediate), JavaScript (Advanced)
- Software and Tools: PyTorch (Advanced), SolidWorks (Advanced), Blender (Advanced), Seurat (Advanced), MIXCR (Advanced), Cellranger (Advanced), HTML (Advanced), SQLite (Advanced), FL Studio (Advanced), Procreate (Advanced), After Effect (Advanced), PS (Advanced), PR (Intermediate)
- OS: Linux (Advanced)

Language:

- Chinese (Native), English (Fluent)

TA EXPERIENCE

CSE1223 Introduction to Java **Columbus, OH**

Teaching Assistant **Sept. 2023 – Dec. 2023**

- Assisted the professor in reviewing and correcting over 1,700 assignments of 300+ students
- Organized more than 20 office hour consultations and helped 30 students deal with their academic questions

AFFILIATION AND ACTIVITY

Luminous Youth Club **Columbus, OH**

Person in Charge of OSU **May 2023 – Present**

- Provide Chinese students at OSU with guidelines regarding their basic necessities of life before and throughout their school years
- Conduct copywriting planning and post Q&A on Xiaohongshu, helping 500+ Chinese students successfully enroll

Competitive Programming Club, OSU **Columbus, OH**

Member **Jan. 2022 – Oct. 2022**

- Attended regular training and competitions organized by the club to improve my programming skills
- Signed up for the International Collegiate Programming Contest representing the club

INTEREST

3D modeling, game development, music production, animation production, digital illustration